UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,962	08/14/2006	Cyuichi Hoshino	06920/0205318-US0	8575

7278 7590 03/24/2010

DARBY & DARBY P.C.
P.O. BOX 770
Church Street Station
New York, NY 10008-0770

EXAMINER	
KOSAR, AARON J	
ART UNIT	PAPER NUMBER
1651	
MAIL DATE	DELIVERY MODE
03/24/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/597,962	HOSHINO ET AL.	
	Examiner	Art Unit	
	AARON J. KOSAR	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-10* is/are pending in the application.

4a) Of the above claim(s) *10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's amendment and argument filed December 17, 2009 in response to the non-final rejection, are acknowledged and have been fully considered. Any rejection and/or objection of record not specifically addressed is herein withdrawn.

Applicant has amended the claims by canceling claims 2 and 3. Claims 1 and 4-10 are pending of which claim 10 remains withdrawn as being drawn to a non-elected invention.

Claims 1 and 4-9 have been examined on the merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 4-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 8 and 10 recites the phrases step "2A" and "2B"; however line 5 recites a "second step" and it is unclear if Applicant intends for 2A and 2B to be further limiting of the second step (e.g. a substep of the second step) or if another interpretation is intended. (see also 37 CFR 1.75(i) and, for example, U.S. Patent No. 7,563,602, claims 1, 16). Clarification is required.

Claim 4, recites the term "it"; however, it is unclear what object(s) Applicant intends for the term to describe. Clarification is required.

Claim 5 recites a "weight-based" ratio; however, it is unclear which ratio (for example w/w, w/v, or another weight-based unit) Applicant intends by the claim. Furthermore, claim 1 as-amended recites multiple sulfuric acid compositions (and does not recite a "mixing ratio" or an active step of "mixing"), and thus it is also unclear which sulfuric acid(s) Applicant intends by the claimed "weight-based ratio of the sulfuric acid". Clarification is required.

Claims 1 and 4-9 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the active, positively recited steps for each step (and substep). In the instant case, please note, although active steps are recited in claim 1 ("pretreating…at a temperature of 30 to 70°C" and "separating"), it is unclear what active, positively recited manipulations and transformations are required or which Applicant intends by the claims (e.g. the phrases "subjecting to saccharification", "subjecting…to filtration", and "subjecting… to monosaccharification treatment" versus positively recited active steps of "saccharifying", "filtering", and "treating… at a temperature of 110 to 150°C" or monosaccharyfying by treating", etc.), and thus the claims do not recite a complete method. Clarification is required.

Claims 6 and 7 recite the terms "uses" and "using"; however it is unclear how the terms further limit a method of producing (method of *making*) monosaccharides and it is also unclear what active positively recited step(s) is/are intended by the terms. (see MPEP §2111.03). Clarification is required.

Claim 6 recites the limitation "the solid". There is insufficient antecedent basis for this limitation in the claim. Clarification is required.

Claim 7 recites the term "separation"; however, it is unclear if Applicant intends for the "separating" in step 2B of if another meaning is intended. Clarification is required.

All other claims depend directly or indirectly from the rejected claims and are, therefore, also rejected under 35 USC § 112, second paragraph, for the reasons set forth above.

Response to Arguments

Applicant has argued that the amendments have overcome the ground of rejection. Applicant's arguments have been fully considered; however, they are not persuasive of error over the instant grounds of rejection, for the reasons applied above to the amended claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farone *et al* (1997, U.S. Patent No. 5,597,714).

A method of making monosaccharides from a biomass is claimed.

Farone teaches a method of producing sugars, the method comprising providing hemicellulosic and cellulosic material (a cellulose-based biomass); mixing the solution with sulfuric acid (H_2SO_4) at a concentration of 25-90% (w/w), preferably 70-77%(w/w) and at a temperature below 80°C or 60°C, preferably about 35-40°C (that is, pretreated in 65-85(w/w)% H_2SO_4 at a temperature of 30-70 °C); diluting the sulfuric acid to about 20-30% (w/w) and heating to a temperature of between about 80 and 100° C (that is, 20-60(w/w)% H_2SO_4 at a temperature of 40-100°C). Farone further teaches that the acid-and-heat treating provides a composition comprising acid and sugar fractions wherein the sugar is separated from the acid

and washed with liquids eluted through filters (that is, washing filtrate) (see whole document, for example figures 1-3).

Farone does not expressly teach an acid-to-biomass weight-based ratio of 0.3 to 5.0 or a step of subjecting in 0.5 to 5% (w/w) sulfuric acid and 100 to 150 °C or that the sulfuric acid and mixing be performed by spraying and kneading.

It would have been obvious to a person of ordinary skill in the art at the time the instant invention was made to have provided in the method of Farone 0.5 to 5% (w/w) sulfuric acid and 110 to 150 °C, because Farone as a whole teaches in general that heating sulfuric acid (5 to 15%, 90-600 °C) with a biomass facilitates hydrolysis to sugars including glucose (monosaccharification). One would have been motivated to have provided dilute 0.5 to 5% (w/w) sulfuric acid and 100 to 150 °C, because Farone teaches that concentrated acid has handling difficulties and would be more costly; that providing dilute acid above 150°C degrades pentoses therein (to furfural); and one would want to minimize the cost and degradation products in the method. One would have had a reasonable expectation of success in providing in the method of Farone a saccharifying step with a dilute acid step as-claimed, because success merely requires providing in the method of Farone treating the same compounds, with the same acid (sulfuric acid), to obtain the same products (glucose, monosaccharides) and adjusting the concentration and temperature of sulfuric acid with the range of it's known effects upon said compounds.

Farone is relied upon for the reasons discussed above. If not expressly taught by Farone, based upon the overall beneficial teaching provided by this reference with respect the addition of acid for the "disruption of bonds" and the effect of increasing acid upon gelation/gel thickness

(col 7, lines 12-15) in the manner disclosed therein, the adjustments of particular conventional working conditions (e.g., determining one or more suitable acid-to-biomass concentration/ proportions or optimal temperature ranges in which to perform such a biomass sulfuric acid digest reaction), is deemed merely a matter of judicious selection and routine optimization which is well within the purview of the skilled artisan. (see also MPEP 2144.05(II))

Also, if not expressly taught by Farone, based upon the overall beneficial teaching provided by this reference with respect to mixing and separating the materials, in the manner disclosed therein, the adjustments of particular conventional working conditions (e.g., selecting among the modes of mixing/separating known to one of skill, the selecting from one or more suitable mode(s) of mixing/separating in which to perform such a mixing/separating, including separating sugars with a simulated moving bed chromatographic separation device) is deemed merely a matter of judicious selection and routine optimization which is well within the purview of the skilled artisan.

From the teachings of the reference, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was prima facie obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Response to Arguments

Applicant has argued that the instantly claimed invention has fewer steps than Farone (or the Arkenol method therein) and that Farone does not recite a monosaccharification treatment. Applicant has also argued that the instant invention has the advantage of decreasing the amount of sulfuric acid in the process and improving the final monosaccharide conversion rate.

Applicant's arguments have been fully considered; however, they are not persuasive of error over the instantly presented grounds of rejection above in light of the amended claims.

In response to Applicant's argument that Farone does not teach a monosaccharification treatment, this is not found to be persuasive in light of the instantly presented for the reasons therein.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., fewer steps or precluding the additional steps of Farone; an amount of sulfuric acid; and a monosaccharide conversion rate; an advantage over an Arkenol process) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In the instant case since the as-claimed method may comprise additional steps and features, including the amounts of sulfuric acid and the products produced thereby as instantly claimed, then Farone still broadly and reasonably is interpreted as rendering obvious the as-claimed method, for the reasons of record and as instantly argued in light of the amended claims.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AARON J. KOSAR whose telephone number is (571)270-3054. The examiner can normally be reached on Monday-Thursday, 7:30AM-5:00PM, ALT. Friday,EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron J Kosar/
Examiner, Art Unit 1651

/Christopher R. Tate/
Primary Examiner, Art Unit 1655